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A MANUAL FOR THEME WRITERS

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A MANUAL FOR THEME WRITERS

CHICAGO
378-388 Wabash Avenue

NEW YORK
156 Fifth Avenue

WE take pleasure in handing you with our compliments this little Manual which we have just published for the English Department of the University of Chicago. It is, as you will see, an effort to bring about a closer connection between the student's work in English and his other studies. Possibly you may find in it something that may be useful to you in your work.

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A MANUAL FOR THEME WRITERS

BY

NOTT FLINT

OF THE UNIVERSITY OF CHICAGO



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PREFACE.

On account of the growing belief among teachers of English that English composition as a required study is not an end in itself but a tool, it has seemed worth while to make an effort looking toward a closer connection between the student's work in composition and his other studies. This pamphlet is such an effort, and it contains:—

1. A list of subjects drawn from other courses in the University open to Junior College students.

2. A list of the more general reference books, and of the libraries where they may be found.

3. Instruction by precept and example in the working up of simple expository subjects.

4. A brief guide to the library system of the University and to the city libraries.

For (1), (4), and part of (2), the material was contributed by instructors in the University and by the University and city librarians.

Though specially intended for work in the English Department of the University of Chicago, the pamphlet, with the exception of (4), is available for such work in other institutions.

Interleaving has been used so that students can make notes upon the theme subjects, enter additional subjects, and also preserve the titles of such new reference books as may be suggested.

NOTT FLINT.

CHICAGO, September, 1903.

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I. PHILOSOPHY.

1. Plato's doctrine of recollection.
 Jowett: *Translation of Plato.* See dialogues Meno, Phaedo, Phaedrus.
2. Plato's arguments for immortality.
 Ibid. Dialogues Phaedrus, Phaedo, and Republic Bk. X.
3. Plato's conception of justice.
 Republic, Bks. I, II, III.
4. Comparison of Plato's view of pleasure in the Ninth Book of the Republic, with J. S. Mill's Utilitarianism.
5. The origin of the idea and feeling of obligation according to Spencer: *Data of Ethics.*
6. The "Ethics of Evolution."
 Huxley: *Works.*
7. The Greek versus the Christian ideal.
 Paulsen: *Ethics.*
8. Indications in the Bible of the primitive clan organization and ethical code; e. g., blood revenge, cities of refuge.
 Especially seen in Books of *Genesis, Judges,* and *Samuel.*

AESTHETICS.

9. Origin of Music.
 Wallaschek: *Primitive Music.*
 Grosse: *Beginnings of Art.*
10. Origin of poetry.
 Gummere: *Beginnings of Poetry.*
11. Tolstoy's view of art.
 Tolstoy: *What is Art?*

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12. Kant's view of the sublime.
 Kant: *Critique of Judgment.*

ETHICS AND PSYCHOLOGY.

13. The relation between mind and body.
 James: *Psychology,* Chap. VIII.
 Dewey: *Psychology,* pp. 37-44.
 Höffding: *Psychology,* Chap. II.
14. Illusions: causes and varieties.
 James: *Psychology,* Chap. XX.
15. Development of the perception of space.
 Dewey: *Psychology,* Chap. V
 Stout: *Psychology* (Manual), Chap. IV.
16. Criticism of Fechnor's view of sensation.
 James: *Psychology,* Chap. II.
17. James's theory of emotion.
 James: *Psychology,* Chap. XXIV.
 Stout: *Psychology* (Manual), Bk. III, Chap. IV.
 Psychological Review, Vol. I, pp. 553 ff.; Vol. II, pp. 13 ff.
18. Critique of James's view of the "Fiat" element in will.
 James: *Psychology,* Chap. on Will.
19. Critique of J. S. Mill's "Utilitarianism."
20. Critique of Herbert Spencer's view of obligation.
 Data of Ethics, Chap. VII.
 Dewey: *Syllabus on Ethics,* Sec. 37.
21. Kant's theory of the moral standard.
 Watson: *Selections from Kant,* Kant's "*Metaphysic of Ethics.*"
 Dewey: *Syllabus of Ethics,* Sec. 36.
 Mackenzie: *Manual of Ethics,* pp. 190 ff.

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22. Berkeley's view of the physical world.
 Fraser: *Selections from Berkeley,* pp. 37-100, 249-295.
23. The pleasure-theory in morals. What does it mean? What is it worth?
 Mill: *Utilitarianism.*
 Spencer: *Data of Ethics.*
 Mackenzie: *Manual of Ethics,* Bk. IV, Chap. IV.
24. The relation of moral goodness to beauty.
 Santayana: *Sense of Beauty,* to p. 52.
 Spencer: *Psychology,* Vol. II, p. 627, Essay on *Style.*
 Mackenzie: *Manual of Ethics,* pp. 177-182.
 Grant Allen: *Physiological Esthetics,* p. 30.
 W. Fite: "Art, Industry, and Science."—*Psychological Rev.,* Mar., 1901.
 See Vernon Lee, in the *Periodical Index.*
25. The basis of natural rights.
 Ritchie: *Natural Rights.*
 Willoughby: *Social Justice.*
 Spencer: *Ethics,* Vol. II, Part IV.—*Social Statics.*
26. Evolutionary theory and ethics.
 Spencer: *Data of Ethics* (first three or four chapters).
 Martineau: *Types of Ethical Theory,* Chap. on Hedonism with Evolution.
 Bixby: *Ethics of Evolution.*
 C. M. Williams: *Review of Evolutionary Ethics.*
27. Professor Dewey's Theory of Conduct.
28. Mind and Body.
 Höffding: *Psychology,* Chap. on Mind and Body.
 James: *Psychology,* Chap. on Automaton Theory.

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Bain: *Mind and Body.*
Ladd's chapter in *Philosophy of Mind.*

29. Free Will.
James: *Psychology,* Chap. on Will.
Sedgwick: *Methods of Ethics,* Chap. on Free Will.

30. A Combined view of Instinct.
James: Chapters on these subjects.

31. Emotion and Will.

32. The Associational Psychology.
James: Chapter on Association.
Titchener: *Outlines of Psychology,* Chap. on Association.
Ziehen: *Physiological Psychology,* Chap. on Association.
W. Fite, in *Philosophical Review,* May and Nov., 1900.

33. A General View of the Nervous System and Its Functions.
James: Chapter on the Brain.

II. PEDAGOGY.

GENERAL.

1. Are the children of your schools made familiar with their own city and its surroundings?
2. To what extent have the kindergarten, manual training, and domestic science been introduced into the schools?
3. Are vacation schools needed in your city?
4. Is commercial instruction provided?
5. Is there any system of self-government?
6. What place does art occupy in the school system?

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7. Is the school building used by the public for social purposes?
8. What are the possible uses of public school buildings?

 Rice: *The Public Schools of the United States.*
 Dewey: *The School and Society.*
 Dutton: *Social Phases of Education.*
 "Vacation Schools" (*Journal of Sociology,* November, 1898).
 Complete Education (monthly, Toledo, O.)
 New York City Report of Play Schools in Manhattan and the Bronx, 1900, 1901.
 Report of Board of Trustees, Public Schools, District of Columbia, 1896, 1897, 1898.
 Public Schools of the District of Columbia (Senate Report No. 711).
 Report of the Board of Education of Massachusetts, 1898-99.
 Leipziger: "Free Lecture System in New York" (*Municipal Affairs,* September, 1899).
 Industrial Education (Washington, 1893).
 Burrage and Bailey: *School Sanitation and Decoration.*

9. What constitutes a secondary school?
10. Elective studies in the secondary schools.
11. The secondary schools of England, Germany, and the United States.

SPECIAL—HISTORY.

12. Colonial industries before the Revolution.
13. The French settlements in Illinois.
14. The conversion of the Indians by the Jesuits.
15. The development of transportation from the Atlantic seaboard to the interior.

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16. History of New Orleans.
17. Primitive invention.

SPECIAL—MATHEMATICS.

18. The spiral method of teaching arithmetic.
19. The lecture method of teaching elementary mathematics.
20. The use of the plane table in teaching elementary geometry.
21. Pestalozzi's method of teaching arithmetic.
22. What parts of arithmetic have a culture value?
23. Should elementary algebra and geometry be taught in grades 7 and 8?
24. The arithmetic and geometry needed in teaching geography.
25. Effect on arithmetical teaching due to the introduction of Hindu (Arabic) numerals.
26. Renaissance arithmetic.
27. Mathematical part of the quadrivium.
28. The defects of the excessive use of objects in teaching arithmetic.
29. Greek arithmetic.
30. Geometry among the Egyptians.
31. What arithmetical knowledge is most needed by the average American citizen?

III. HISTORY.

MEDIAEVAL.

1. The causes of the decline of the Roman Empire.
2. The contributions of the Germanic race to history.
3. The causes of the rise of the Papacy.
4. Mohammed and his teachings.
5. Monasticism: its influence on mediaeval civilization.

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6. Theodoric the Ostrogoth.
7. Alfred the Great.
8. Charlemagne as a statesman.
9. Charlemagne and the revival of learning in the ninth century.
10. The influence of the invasions of the Northmen on Europe.
11. The part of France in the Crusades.
12. Abelard.
13. St. Bernard.
14. The rise of the English parliament.
15. The Papacy at Avignon.
16. Mediaeval commerce.
17. Foregleams of the Renaissance.
18. Foregleams of the Reformation.
19. The rise of Switzerland.
20. Renaissance art.
21. Renaissance literature.
22. Chivalry.
23. Early exploration and discovery (ante 1492).

AMERICAN.

24. Jefferson Davis as a statesman.
25. Anti-slavery sentiment in the South, 1857-1860.
 Burgess: *The Civil War and the Constitution*, Vol. I, Chap. II.
26. The attack on Fort Sumter and its effect on (a) South, (b) North.
27. John Brown at Harper's Ferry.
28. The Crittenden Compromise.
29. The Constitution of the Confederate states—How did it resemble and how differ from that of the United States.

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30. The Trent affair.
Life of Charles Francis Adams and *Life of William H. Seward.—American Statesmen Series.*
31. Negro soldiers in the civil war.
32. The prospects of the Confederate states in 1861. (Reasons for hoping for successful rebellion.)
33. The border states.
34. The blockade of Southern ports.
35. The Monitor and the Merrimac.
36. The attitude of France in the civil war.
37. The attitude of England in the civil war.
38. Stonewall Jackson as a commander.
39. The Knights of the Golden Circle.
40. The siege of Vicksburg.
41. Sherman's march to the sea.
42. A comparison and a contrast: McClellan and Grant in Virginia.
43. Problems connected with emancipation.
44. The emancipation proclamation.
45. Confederate blockade runners.
46. The Laird rams. (For fine study.)
Adams: *Charles Francis Adams.*
47. Maximilian in Mexico.
48. Charles Francis Adams at the Court of St. James.
49. Financial problems of the United States during the war.
50. Financial problems of the Southern Confederacy.
51. The organization of the State of West Virginia.
52. The battle of Gettysburg.
53. The draft as a means of raising armies.
54. How armies were raised by the United States, 1861-1865.

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55. Northern opposition to the Union side during the war.
56. The draft riots in New York.
57. The Republican opposition to Lincoln's re-election (1864).
58. Lincoln's plan of reconstruction.
59. Charles Sumner during the civil war.
Life of Sumner.—American Statesmen Series.
60. The work of the United States Congress during the rebellion.
61. The impeachment of President Johnson.
62. Arbitrary acts of President Lincoln during the war.
63. Horace Greeley's plan for peace in the midst of the war.
64. The Alabama award (Geneva award).
65. The value of the cavalry in the civil war.
66. The importance of the Shenandoah Valley to the South.
67. The navy in the civil war.
68. The treatment of prisoners by the South.
69. The exchange of prisoners.
70. The terms of peace as arranged at Appomattox.
71. The Thirteenth Amendment to the Constitution.
72. The Fourteenth Amendment to the Constitution.
73. The Fifteenth Amendment to the Constitution.
74. The Freedmen's Bureau.
75. The United States Sanitary Commission.
76. General Lee's attitude toward secession.
77. The process of secession.
78. Views regarding the right of secession (1860-1861).
79. The postoffice in civil war time. (For interesting study.)
Annual Reports of the Postmaster General.

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80. How the armies were fed during the civil war.
Quartermaster General's Reports.
81. General Butler's "Contraband of War" theory: Was it sound?
82. The Democratic national convention in 1864.
83. The railroad and its importance in civil war times.

IV. SOCIOLOGY.

1. Utopia.
More: *Utopia.*
2. The Prince.
Macchiavelli: *The Prince.*
3. The City of the Sun.
Campanella: *The City of the Sun.*
4. The New Atlantis.
Bacon: *The New Atlantis.*
5. Nature and Man in America.
Shaler: *Nature and Man in America.*
6. The present and future of the negro.
Bryce: *American Commonwealth,* Vol. II.
7. The home of the nation.
Bryce: *American Commonwealth,* Vol. II.
8. The significance of topography and climate in the determination of social conditions.
Reclus: *The Earth. North America.*
Shaler: *Outlines of the Earth's History. Nature and Man in America.*
Geikie: *Earth Sculpture.*
Zueblin: "England's Dominant Industrial Position."—*Jour. Pol. Econ.,* March, 1897.
Whitney: *The United States.*
Shaler: *The United States,* Vol. I, Chaps. I-III, V, VI.

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Pearson: *National Life and Character,* Chaps. I, II.

Payne: *History of America,* Vol. I, Bk. II.

9. Is the life of a large city injurious to the physical welfare of a nation?

George: *Progress and Poverty.*

Hobson: *Evolution of Modern Capitalism,* Chaps. V, VI.

von Halle: *Trusts.*

Lloyd: *Wealth Against Commonwealth.*

Ely: *Monopolies and Trusts.*

Proceedings of the National Deep Waterways Association.

Baker: *Manual of American Waterworks.*

Hadley: *Railway Transportation.*

Whitney: *The United States.*

Weber: *The Growth of Cities.*

James: "The Growth of Cities."—*Annals of the Am. Academy.*

10. The organization of capital.

11. The organization of labor by capital and by labor.

12. Is competition the life of trade?

13. How much co-operation is there in contemporary industry?

14. Centralization and decentralization in modern industry.

15. The British co-operative movement.

Hobson: *The Evolution of Modern Capitalism,* Chaps. IV, V, VII, XI, XIII.

Taylor: *The Modern Factory System.*

Hobhouse: *The Labor Movement.*

Wright: *The Industrial Evolution of the United States, Part IV.*

Kropotkin: *Fields, Factories, and Workshops.*

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16. The effect of women on industrial problems.
17. The position of women in contemporary life.
 a. Economic.
 b. Political.
 c. Intellectual.

 Geddes and Thompson: *Evolution of Sex*, Chaps. I, II, XIX-XXI.
 Ellis: *Man and Woman.*
 Mrs. Stetson: *Women and Economics.*
 Carpenter: *Love's Coming of Age.*
18. The necessity of equality between the sexes.
19. The need of physiological instruction for boys and girls.
20. The rights and obligations of children and parents.
21. Is a greater equality of the sexes possible and desirable.
22. What could be done through voluntary agencies to promote better relations of the sexes?
23. What are the physiological merits of early and of late marriages?
24. Why do American children lack reverence?

 Geddes and Thompson: "The Moral Evolution of Sex."—*The Evergreen*, Summer, 1896.
 Morley, Margaret: *The Song of Life.*
 Morley, Margaret: *Life and Love*, Chaps. XV-XXII.
 Carpenter: *Love's Coming of Age.*
 Pearson, Karl: *The Chances of Death*, Vol. I, Chaps. III, VII.
 Pearson, Charles: *National Life and Character*, Chap. V.
 Mayo-Smith: *Statistics and Sociology*, Chaps. IV, VI.
 Mrs. Stetson: *Women and Economics.*

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Mrs. Wiggin: *Children's Rights.*
Spencer: *Education.*
Publications of Divorce Reform League.
Marriage and Divorce, Report of the Commissioner of Labor, 1889.

25. How streets are cleaned in ——.
26. What the problem of street cleaning involves.
27. Comparison of American with foreign systems of drainage and sewerage.
28. Municipal methods of disposing of the dead.
Waring: *Street Cleaning in New York and Abroad.*
Waring: *Report on Final Disposition of the Wastes of New York.*
Waring: *Modern Methods for Sewerage Disposal.*
Brown: *Chicago Drainage Channel and Waterway.*
"Sewerage in Foreign Cities."—*U. S. Consular Report,* No. 173.
Willoughby: *Public Health and Demography,* Chap. III.
29. An adequate system of parks and playgrounds.
Will: "Playgrounds and Parks,."—*Arena,* 1894, p. 274.
"Municipal Playgrounds."—*Journal of Sociology,* September, 1898.
Tsanoff: *The Playground Movement,* Philadelphia, 1898.
Tsanoff: "Children's Playgrounds."—*Municipal Affairs,* June, 1898.
O'Brien: "Recreation Piers."—*Municipal Affairs,* September, 1897.

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Eliot: "Boston Metropolitan Reservations."—*N. E. Magazine,* September, 1896.

30. The social and educational influence of young people's societies.
31. The effects of the employment of women in factories.
32. The proper relation between employer and employed.
33. The proper relation between rich and poor.
34. Effect of racial differences in municipal life.
35. Influence of clubs on the community life.
36. Shall the saloon be abolished or reformed?
37. To what extent may the state supersede the family in the care of children?

Bryce: *Social Institutions of the United States.*
Hamerton: *Human Intercourse,* Essays IX, X, XXVI.
Emerson: *Society and Solitude.*
Hull-House Maps and Papers.
"The Poor in Great Cities."—*Scribner's.*
Barnett: *Practicable Socialism.*
Gould, E. R. L: *The Gothenburg System.*
Moore: "The Social Value of the Saloon," *Journal of Sociology,* July, 1897.
Rountree and Shadwell: *The Temperance Problem and Social Reform.*

38. The organization of national political parties.
39. Tammany Hall—its history—influence—system.
40. Relations of business to politics.
41. Civil service reform—federal—municipal.
42. The decay of provincialism.
43. What constitutes intelligent citizenship.

Chapman: *Causes and Consequences,* Chaps. I, V.

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Chapman: *Practical Agitation.*
Bryce: *American Commonwealth,* Parts I-III.
Ritchie: *State Interference.*
Green, T. H.: *Grounds of Political Obligation.*
Maltbie: "Municipal Functions."—*Municipal Affairs,* December, 1898.
Bemis: *Municipal Monopolies.*
Strong: *The New Era.*
Shaw: *Municipal Government in Great Britain.*
Goodnow: *Municipal Problems.*
Eaton: *The Government of Municipalities.*
Proceedings of the National Municipal League.
Coler: *Municipal Government.*

44. Suggested improvements for the protection of your city against fire.
45. What are the kinds and the relative merits of the paving used in your city? Comparison with other cities.
46. What disposition is made of the city's refuse?
47. Suggested improvements in the water supply.
48. Is the city adequately and economically lighted?

Bemis: *Municipal Monopolies,* Chaps. I, II, III.
"Corporations and Public Welfare," Addresses at the Fourth annual meeting of the American Academy of Political and Social Science, 1900.
Parsons: *The City for the People,* Chap. I.
Coler: *Municipal Government,* Chap. V.
Waring: "Street Cleaning in the City of New York" (Supplement, Vol. II, No. 2, of *Municipal Affairs*).
Baker: *Manual of American Water Works.*
The Water Supply of the City of New York (Merchants' Association, New York, 1900).

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Address of Mayor Josiah Quincy to the City Council of Boston, January, 1897.

Annual Report of Metropolitan Sewerage Commissioners, Boston.

Report of Board of Metropolitan Sewerage Commissioners upon a High Level Gravity Sewer, Boston.

Reports of the Metropolitan Water Board, Boston, January, 1899.

Report of Gas and Telephone Companies, District of Columbia, 1898.

Report of Commission on the Chicago River.

Brown: *Drainage Channel and Waterway.*

The Recent Administration of the Department of Public Works, City of New York, September, 1897.

Nineteenth Annual Report of the United States Geological Survey, 1897-98. Hydrography.

Waring: *Modern Methods of Sewage Disposal.*

Report of the Pollution of Rivers. Talbott. (Washington, 1898.)

Pollution of Water Supplies Report (Washington, 1900).

Water, Gas, and Electric Light Plants (Washington, 1899).

Chapin: *Public Sanitation* (Providence, 1901).

49. What would constitute a comprehensive plan for parks and boulevards for your city?
50. Is anything done to preserve your trees?
51. How are the different portions of the city provided with parks, and what is the number of people to each acre of park space?
52. The park system of Boston and its suburbs.

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53. How would the city life of the future be affected if all cities should make such provision as Boston has made?
54. What has your city done towards providing playgrounds for children?
55. What proportion of children in your city lack adequate provision for play?
56. What proportion of the population of Chicago enjoys a summer outing?
57. What does the city do to encourage athletics?

Riis: *A Ten Years' War.*

Hunter: *Tenement Conditions in Chicago.*

Report of the Tenement House Committee of 1894.

Tolman: *Public Baths and Comfort Stations.*

Tsanoff: *Children's Playgrounds.*

Henry, Arthur: "The Outdoor Recreation League" (*Outlook,* January 6, 1900).

Outdoor Recreation League Advocate (monthly, New York).

Complete Education (monthly, Toledo, O.).

"Municipal Playgrounds" (*American Journal of Sociology,* September, 1898).

Chicago Daily News Fresh Air Fund Reports.

Reports of the Play Schools, New York, 1900, 1901.

Reports of Metropolitan Park Commission, Boston.

Eliot: "Boston Metropolitan Reservation" (*New England Magazine,* September, 1896).

Nadal: "New Parks" (*Scribner's Magazine,* 1892).

Hyatt: "The Next Stage in the Development of Public Parks" (*Atlantic Monthly,* 1891).

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Fairmount Park Art Association Reports.
American Park and Outdoor Art Association Proceedings.
Year Book, Audubon Park Association (New Orleans, 1900).
Robinson: *The Improvement of Towns and Cities.*

ANTHROPOLOGY.

58. Poetry of the North American Indians.
59. The dancing mania in the fourteenth century.
60. Lucky numbers.
61. The rock-paintings of the Bushmen.
62. An Australian corroborree.
63. The currency of Old Mexico.
64. Food tabus of the Polynesians.
65. Blood-brotherhood among the Arabs.
66. The medicine man.
67. The evil eye.
68. The practice of immuring.
69. The place of slavery in man's development.

SANITARY SCIENCE.

70. Historical development of sanitation.
71. The Chicago department of health and its powers.
72. Household disinfection.
73. The householder as a sanitarian.
74. Legal restrictions of food products.
75. Popular fallacies in regard to the values of food products.
76. Food adulterations.
77. Control of the milk supply.

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V. GREEK LITERATURE.

1. A dramatic performance in ancient Athens compared with one on the modern stage.
 See any history of Greek literature, or Haigh: *Attic Theatre.*
2. Browning's rendering of the Alcestis of Euripides.

VI. LATIN LANGUAGE AND LITERATURE.

1. Cato's defense of old age.
 Cicero: *De Senectute.*
2. Cicero as a philosopher.
 Davidson: *Biography of Cicero.*
 Fowler: *Biography of Cicero.*
3. The Epicurean system of philosophy.
 Zeller.
4. The Stoic system of philosophy.
 Zeller.
5. Terence as a representative of Roman comedy.
 Mommsen: *History of Rome,* Vol. II, p. 504.
 Elmer: *Phormio,* and references.
6. The Roman Theatre.
 Same as for 5.
7. Hannibal's march.
8. The battle of Cannae.
 Lord's ed. of 21st and 22d books.
 Mommsen: *History of Rome*
9. The constitution of the Roman army.
10. Roman military tactics.
 Judson: *Caesar's Army.*
11. Roman ships.
12. Roman naval maneuvers.
 Torr: *Ancient Ships.*

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13. Livy as a historian.
 Taine: *Essai sur Live.*
 Introduction to Serley's ed. of Bk. I.
14. General characteristics of Augustan, as compared with Republican literature.
15. Horace's lyric poetry.
 Tyrrell: *Latin Poetry.*
 McKail: *Latin Literature.*
 Shorey: *Ed. of Odes and Epodes.*
16. Influence of Horace's odes upon English poetry; (1) of the eighteenth century; (2) of the nineteenth century.
 Shorey: *Ed. of Odes and Epodes.*

VERGIL.

17. Vergil's debt to Homer.
18. The characters of the *Aeneid.*
19. The *Aeneid* as a national poem.
 Covington: *Essays.*
 Meyer: *Essays.*
 Tyrrell: *Latin Poetry.*
 McKail: *Latin Literature.*
20. The mediaeval conception of Vergil.
 Comparetti: *Vergil in Middle Ages.*

ROMAN PRIVATE LIFE.

21. Patria potestas.
 Poste's ed. of Institutes of Gaius.
22. Roman elementary education.
23. Roman secondary education.
24. Roman higher education.
 Laurie: *Pre-Christian Education.*
25. Roman marriage rites.

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Smith: *Dictionary of Greek and Roman Antiquities.* (See Matrimonium.)
Johnston: *The Private Life of the Romans.*

26. Legal aspects of marriage among the Romans.
Poste: ed. of Institutes of Gaius.
Johnston: *The Private Life of the Romans.*

27. The Roman house.

28. Pompeian wall paintings.

29. Roman architecture

30. The worship of Isis among the Romans.
Smith: *Dictionary.* (See Isis.)
Mau: *Pompeii, Its Life and Art.*
Rosengarten: *Architectural Styles.*
Johnston: *The Private Life of the Romans.*

ROMAN PUBLIC LIFE.

31. The worship of Vesta.
Lanciani: *Ancient Rome in the Light of Recent Discoveries.*

32. The worship of the emperors.
Rushforth: *Latin Historical Inscriptions.*

33. The Roman circus.
Middleton: *Remains of Ancient Rome.*
Lanciani: *Ruins and Excavations.*

34. The Coliseum.
Middleton: *Remains of Ancient Rome.*
Lanciani: *Ruins and Excavations.*

35. The bathing establishments at (1) Rome, (2) Pompeii.
Mau: *Pompeii, Its Life and Art.*
Middleton: *Remains of Ancient Rome.*
Lanciani: *Ruins and Excavations.*

36. Rome's water supply.

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37. The transmission of ancient literature.
Thompson: *Greek and Latin Paleography.*
Johnston: *Latin Manuscripts.*

VII. GERMAN LITERATURE.

1. The condition of Germany during and after the Thirty Years' War.
2. The Wallenstein of Schiller's play and the Wallenstein of history.
3. The Iphigenia of Goethe and the Iphigenia of Euripides.
4. The Medea of Grillparzer and the Medea of Euripides.
5. The story of the Nibelungenlied.
6. Tasso and Antonio (in Goethe's Tasso) as representative men.
7. Is Wallenstein (Schiller's play) guilty?
8. The treatment of nature in Goethe's Werther.
9. A critical estimate of Heine as a lyrical poet.
10. E. A. T. Hoffmann and E. A. Poe compared.
11. A critical estimate of Th. Storm as a novelist.
12. A critical discussion of Sudermann's *Frau Sorge.*
13. The Symbolism in Hauptmann's *Versunkene Glocke.*

VIII. ENGLISH.

1. Shakspere's use of contrasted characters.
2. Comment on those features in Milton's *L'Allegro* which have nothing to correspond to them in *Il Penseroso,* and the reverse.
3. Determine the favorite themes in any one book of Palgrave's *Golden Treasury,* and comment on them.

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SHAKSPERE.

4. Technical analysis of the plot and structure of *King Lear*. (Similarly of other plays, especially tragedies.)
5. Compare the story of Shakspere's *Lear* with the sources in Holinshed, and in the anonymous play of *Leir*. (Similarly, *mutatis mutandis*, for other plays.)
6. The use of verse and prose in *Midsummer Night's Dream*.
7. Essay on the character of Richard II (in Shakspere's play of that title). (Similarly for other striking characters in Shakspere.)
8. Was Hamlet mad? Was he irresolute? Compare Shakspere's treatment of insanity in other plays.
9. Influence of Spenser on English poetry to 1650.
10. John Donne: the question of his originality, and of his poetic genius.

AMERICAN LITERATURE.

11. American Colonial verse.
12. The Revolutionary songs and ballads.
13. The Indian in American literature.
14. Bryant's treatment of nature.
15. Translations in America (Bryant, Longfellow, Taylor).
16. Taylor's Oriental poems.
17. The Oriental element in Whitman and Emerson.
18. Lowell's treatment of the slavery question.
19. Poe's "Symbolism."
20. The effects of Puritanism on art.
21. Whitman's Democracy.
22. The literature of Indiana.
23. Criticism of Wendell's *Literary History of America*.

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24. Transcendentalism in New England.
25. Comparison of Northern and Southern literature.

IX. PHYSICS.

1. Osmotic pressure.
2. Diffusion of gases.
3. Kirchoff's law of absorption and emission.
4. Faraday's laws of electrolysis.
5. Simple harmonic motion.
6. Wave motion.
7. Stationary waves.
8. Organ pipes.
9. Vibrating strings.
10. The musical scale.
11. Interference of light waves.
12. Diffraction of light waves.
13. The prism.
14. The diffraction grating.
15. The solar spectrum.
16. The X-rays.
17. Electric induction.
18. Polarization of light.
 See texts of physics, like Watson, Hastings and Beach, or Daniel.
19. The fundamental units of the metric system and the history of their derivation.
 Daniel: *Physics,* pp. 9-13.
20. Critical temperature.
 Watson: *Physics,* pp. 277-283.
21. Liquification of gases.
 Daniel: *Physics,* pp. 286-289.
22. Liquid air and its uses.
 Edser: *Heat,* pp. 386-391.

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23. Theories of heat.
 Maxwell: *Heat.*
24. The absolute zero.
 Watson: *Physics,* p. 227.
25. Temperature and its measurement.
 Watson: *Physics,* pp. 206-212.
26. Musical instruments.
 Hastings and Beach: *Physics,* pp. 591-598.
27. The physical theory of music.
 Ganot: *Physics,* pp. 224-230.
28. The tempered musical scale.
 Watson: *Physics,* pp. 376-383.
29. Whispering galleries.
 Ganot: *Physics,* p. 213.
30. How the velocity of sound is measured.
 Ganot: *Physics,* p. 205.
31. The theory of beats.
 Watson: *Physics,* p. 426.
32. The velocity of light.
 Watson: *Physics,* pp. 504-509.
33. The solar spectrum and what it teaches us.
 Hastings and Beach: *Physics,* p. 707.
 Ganot: *Physics,* pp. 551-553.
34. The phonograph.
 Watson: *Physics,* p. 440.
35. The eye as an optical instrument.
 Hastings and Beach: *Physics,* pp. 628-630.
 Daniel: *Physics,* pp. 570-571.
36. "Pin-hole" photography.
 Watson: *Physics,* p. 444.
37. History of photography.
 Abney: *Treatise on Photography.*
38. Franklin and his kite.
 Ganot: *Physics,* pp. 1017-1023.

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39. The dynamo.
 Ganot: *Physics*, pp. 897-915.
40. The history of the incandescent lamp.
 Ganot: *Physics*, pp. 817-820.
41. The telegraph in theory and in practice.
 Watson: *Physics*, pp. 775-776.
42. Roentgen rays and their use.
 Watson: *Physics*, pp. 844-845.
43. The applications of electricity.
 Watson: *Physics*.
44. The rainbow.
 Hastings and Beach: *Physics*, pp. 693-700.
45. Mirage.
 Hastings and Beach: *Physics*, pp. 685-688.
46. The kinetic theory of gases.
 Hastings and Beach: *Physics*, p. 290.

X. GEOLOGY AND PHYSIOGRAPHY.

1. The history of a waterfall.
2. The origin and growth of a river valley.
3. An exposition of the thesis—"Rivers are the mortal enemies of lakes."
4. The history of a geyser.
5. The origin of a cañon.
6. The cañon of the Colorado river.
 Dutton: The tertiary history of the Grand Cañon district.
 Powell: The cañons of the Colorado.
7. Conditions controlling the amount of precipitation.
8. The causes of periodic dry seasons.
9. What are the conditions influencing the amount of the daily variation of temperature?
10. Why is the moon more influential than the sun in the production of tides?

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11. The history of Lake Michigan.
 Taylor: *Studies in Indiana Geography.*
12. Coral islands.
13. Caves; or some particular cave, such as Mammoth, Wyandotte, etc.
14. Resources of Porto Rico.
15. Effects of forests on floods.
16. Why should forests be preserved?
17. Soil making.
18. An erosion cycle.
19. The recognition of former cycles of erosion (argumentative).
20. The story of Niagara Falls.
21. The geological history of the Chicago region.
22. The geological history of any region the student may be acquainted with.
23. The development of a flood-plain.
24. The development of a delta.
25. The formation and movement of a glacier.
26. A description of the surface features of a valley glacier.
27. The records of the ancient ice sheet of North America.
28. A trip over a glacier (narrative).
29. Distinct glacial epochs.
30. Has the Chicago region been invaded by glacier ice (argumentative)?
31. Activities along shores.
32. The recognition of an ancient shore-line (argumentative).
33. Mountain forms as related to geological structures.
34. The geological history of the Appalachian mountains.
35. The geological history of any mountain system.

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36. The ascent of Mount ———.
37. Mountain-making forces.
38. Evidence of great coastal movements (argumentative).
39. Evidences of great coastal movements in a given region.
40. The life history of a volcano.
41. A visit to a volcano.
42. The work of the winds.
43. A sand dune region (descriptive).
44. The basis for a classification of the common rocks.
45. The value of paleontology to a geologist.
46. The physical evolution of the North American continent.
47. The great coal beds.
48. Natural oils and gases.
49. The development of great underground caves.
50. Description of (any cave).
51. How underground waters reach the surface.
52. Ore deposits.
53. Lavas and lava flows.
54. The influence of topography on the settlement and development of regions.
55. The influences of the shore-line conditions on the settlement and development of the country.
56. Corals and coral islands.
57. Narratives of field trips.

XI. ZOOLOGY.

1. Immortality of the Protozoa.
2. The inheritance of acquired characteristics.
3. The origin of sex.
4. Physiological division of labor.
5. Brain as organ of mind.

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6. Automatism (psychic).
7. The recapitulation theory.
8. History of the cell-theory.
9. The preformation theory of development.

XII. BOTANY.

1. The plant cell. (A description of its parts and of their position and function.)
2. The partnership in lichens. (The imprisonment of an alga by a fungus; how they get on together; the resulting form.)
3. The bacteria. (Modes of life, distribution, effects.)
4. Habits of the molds.
5. Liverworts. (The form of the body; its adaptation to its environment; distribution.)
6. The mosses. (The form of the body; its adaptation to its environment; distribution.)
7. The development of fruits. (The secondary effect of fertilization on adjacent tissues.)
8. Pollination. (Methods and structures which aid or limit this process. A single flower such as an orchid or dandelion might be worked out.)
9. A biological failure. (Showing how too great specialization of structure in the mosses has proved a biological mistake from the standpoint of evolution.)
10. The vascular system in plants. (A general description of its structure and work.)
11. Pine cones. (A general description, accompanied by a discussion of the successive changes through which the cone passes before and after pollination and its final adaptations for seed dispersal.)
12. An old theory of the evolution of the flower.

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(Goethe's idea of metamorphosis, set forth in Gray's *Structural Botany.*)

13. Form and arrangement of leaves. (Advantages and disadvantages of various types from the standpoint of getting light.)
14. Plant protection. (A discussion of the merits of the various structures which are supposed to protect plants menaced by external conditions, especially drouth.)
15. The forms of stems. (Advantage secured by the various types, underground and aerial.)
16. Parasitic plants. (Including parasitism of bacteria, fungi, and seed plants.)
17. Seed dispersal. (A discussion of the various modes by which seeds are scattered, and their efficiency.)
18. The dissemination of spores. (A similar discussion with reference to the lower plants.)
19. Insectivorous plants. (One kind may be discussed in detail, or the various methods by which plants capture insects may be summarized.)
20. Water and the plant. (A study of the physiological relation of water to the plant body.)
21. Water and plant life. (A discussion of the relation of water to the distribution of plants.)
22. Pond societies. (The features of these groups, including notice of the characteristic plants and their structures.)
23. Xerophytic societies. (Such as those inhabiting dunes, or rocks, or deserts, or mountains. The features of these groups, including notice of the characteristic plants and their structures.)
24. Forest societies. (The features of these groups, including notice of the characteristic plants and their structures.)

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25. Transpiration. (The loss of water by evaporation from plant parts; the reasons for it and the dangers attending it.)
26. How green plants make food. (A study of photosynthesis, often called assimilation or carbon-assimilation.)
27. Climbing plants. (The organs for climbing, their sensitiveness to external changes, and the advantages gained by climbing.)
28. Light and its relation to plants. (Food making; adjustment of the position of parts to the direction of light, diurnal and nocturnal change of position.)
29. Compass plants.
30. Respiration. (The identity of plant and animal respiration; the ærating system of plants and its relation to other functions; the purpose and effects of respiration.)
31. The waste products of plants and their use to man.
32. How young plants get above ground. (Types of germination by which the embryos emerge from the seed coats and break through the soil.)
33. How plants grow. (Conditions, rate or growth, and the influence upon it of external conditions.)
34. Movements of plants. (Due to the influence of light, heat, gravity, moisture, and other external agents upon the living organism.)
35. The discharge of seeds and spores. (Methods by which spore cases and seed pods are caused to burst forcibly and eject their contents.)

XIII. PATHOLOGY AND BACTERIOLOGY.

1. Metschinkoff's phagocyte theory.
 Metschnikoff: *L'Inflammation.*
 Muir and Ritchie: *Manual of Bacteriology.*

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2. The action of diphtheria antitoxin.
 Muir and Ritchie: *Manual of Bacteriology.*
3. Hæmolysis.
 Medical Record, Aug. 3, 1901.
4. Agricultural bacteriology.
5. Typhoid fever and water supply.
 Sedgwick: *Principles of Sanitary Science.*

GENERAL BIBLIOGRAPHY.*

CYCLOPAEDIAS.

Encyclopædia Brittanica. 24 v. and index.
1. 19. 21.

American Cyclopædia. 16 v.
1. 5.

Chambers: *Encyclopædia.* 10 v.
1.

International Cyclopædia. 15 v.
1.

Universal Cyclopædia. 12 v.
1. 14. 21.

YEAR BOOKS.

Almanacs issued by:

New York World.
1.

New York Tribune.
9. 21.

Chicago Daily News.
1.

These reading lists are of two kinds—general and special. The general list comes first, and includes various kinds of miscellaneous reference works. Under each title are numbers which will indicate precisely what libraries this particular work may be found in. The key to the numbers and the directory of the libraries is at the end of the book. The special lists, given under the departmental headings, should be sought in the departmental libraries. In some cases, also, particular references are given in connection with the subjects. (See lists of subjects.)

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Almanach de Gotha.
9.
Annual Register.
5.
Appleton: *Annual Cyclopædia.*
1. 5. 21.
British Almanack.
23.
Revue Encyclopédique. Pub. fortnightly, yearly vols. in continuation of Larousse. 2 v. in 4.
25.
Statesman's Year-Book.
1. 21.
Whitaker: *Almanack.* 1903.
26.
Who's Who.
1. 21.
Who's Who in America.
1. 21.

GAZETTEERS, ATLASES, ETC.

Droysen: *Atlas.*
1. 5.
Freeman: *Historical geography of Europe.*
5. 9.
Keith Johnston: *Royal atlas of modern geography.*
7.
Labberton: *Historical atlas.*
25. 23.
Lippincott: *Pronouncing gazetteer.*
1. 21.
Rand, McNally & Co.: *Commercial atlas and handbook.*
21.

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Smith: *Atlas of ancient geography.*
25.
Spencer: *Atlas.*
5. 21.

DICTIONARIES OF LANGUAGE—ENGLISH.

Century Dictionary.
1. 2. 21.
Century Dictionary and Cyclopedia.
1. 5. 21.
Century Dictionary, Cyclopedia and Atlas.
1. 14. 5. 26. 21.
Imperial.
1.
Murray: *New English dictionary on historical principles.* Complete to vol. 5-K.
1. 2.
Skeat: *Etymological dictionary of the English language.*
2.
Standard.
20. 1. 3. 21.
Stormonth: *English Dictionary.*
2.
Webster: *International.*
1. 2. 13. 11. 9. 18. 21.
Worcester: *Standard Dictionary.*
2.

QUOTATIONS.

Allibone: *Poetical quotations from Chaucer to Tennyson.*
1. 2.
Bartlett: *Familiar quotations.*
1. 2. 21.

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Brewer: *Dictionary of phrase and fable.*
1. 2. 21.
Brewer: *Reader's handbook.*
1. 2. 21.
Brewer: *Dictionary of miracles.*
24.

SYNONYMS.

Crabb: *Synonyms.*
1. 21.
Frey: *Sobriquets and nicknames.*
24.
Roget: *Thesaurus.*
1. 2.
Smith: *Synonyms discriminated.*
1. 2.
Soule: *Synonyms.*
1.

DICTIONARIES OF BIOGRAPHY.

Appleton: *Cyclopædia of American biography.*
1. 9. 21.
Allgemeine Deutsche Biographie.
3.
Biographie Universelle.
23.
Dictionary of national biography.
1. 5.
Men and women of the time.
1. 21.
National cyclopædia of American biography.
23. 25.
Phillips: *Dictionary of biographical reference.*
23.
Rose: *Cyclopædia of Canadian biography.*
23. 25.

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Thomas: *Dictionary of biography and mythology.*
23. 25.
Vapereau: *Dictionnaire des contemporains.*
1.

DICTIONARIES OF FINE ARTS.

Appleton: *Cyclopædia of drawing.*
23. 25. 27.
Bryan: *Dictionary of painters and engravers.*
25. 23.
Champlin and Perkins: *Cyclopædia of painters and paintings.*
1. 23.
Clement and Hutton: *Artists of 19th century.*
1. 21. 27.
Grone: *Dictionary of music and musicians.*
16.
Gwilt: *Encyclopædia of architecture.*
23.
Nicholson: *Encyclopædia of architecture.*
23.
Owen Jones: *Grammar of ornament.*
21. 23. 25.
Parker: *Glossary of terms used in architecture.*
5.
Viollet-le-Duc: *Dictionnaire de l'architecture.*
5.

BIBLIOGRAPHY OF FINE ARTS.

Sturgis and Krehbiel: *Annotated bibliography of fine arts.*
21.

DICTIONARIES OF INDUSTRIAL ARTS.

Appleton: *Cyclopedia of applied mechanics.*
23. 25.

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Appleton: *Modern mechanism.*
23.
Houston: *Dictionary of electrical words.*
18.
Knight: *Mechanical dictionary.*
21. 23. 25.
Spons: *Encyclopædia of the industrial arts.*
23.
Thorpe: *Dictionary of applied chemistry.*
23. 25.
Watts: *Dictionary of chemistry.*
15.

INDEXES.

A. L. A.: *Index to general literature.*
1.
Annual literary index.
1. 21.
Cumulative Index.
1. 2.
Index to periodicals. (Published monthly in *Review of Reviews.*)
1.
Index to union periodicals in public libraries of Chicago and Evanston.
1. 2. 21.
Poole: *Index to periodical literature.* 5 v.
1. 21.
Poole: *Index to periodical literature.* (Abridged edition. 1 v.)
1.
Reader's guide to periodical literature. 2 v. (Published monthly. December number record for whole year.)
21.

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BOOKS ABOUT BOOKS.

Dana: *Library primer.*
1. 21.

Koopman: *Mastery of books.*
1. 21.

Spofford: *Book for all readers.*
21. 25.

SPECIAL BIBLIOGRAPHIES.

POLITICAL ECONOMY.

Bliss: *Encyclopædia of social reform.*
10.

Bowker and Iles: *Reader's guide in economic, social, and political science.*
10. 21.

Palgrave: *Dictionary of political economy.*
6.

POLITICAL SCIENCE.

Bliss: *Encyclopædia of social reform.*
10.

Bowker and Iles: *Reader's guide in economic, social, and political science.*
10. 21.

Lalor: *Dictionary of political science.*
1.

HISTORY.

Adams, C. K.: *Manual of historical literature.*
1. 9. 21.

American Library Association: *Annotated guide.*
1.

Chambers: *Book of days.*
2. 21.

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Channing and Hart: *Guide to study of American history.*
1. 5. 21. 26.

Gardiner and Mullinger: *Introduction to English history.*
5.

Gross: *Sources and literature of mediæval history.*
5.

Haydn: *Dictionary of dates.*
5. 21.

Heilprin: *History reference book.*
21.

Hone: *Every-day book.*
23.

Jameson: *Dictionary of American history.*
1.

Larned: *History of ready reference.*
5. 21.

Larned: *Literature of American history.*
5. 1. 21.

Lavisse and Rambaud: *Histoire générale.*
5.

Lossing: *Cyclopædia of American history.*
25.

Low and Pulling: *Dictionary of English history.*
5.

Putnam: *World's progress.*
23. 25.

Sabin: *Bibliotheca Americana.*
5.

Winsor: *Handbook of American Revolution.*
1.

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Winsor: *Narrative and critical history of the United States.*
21.

Woodward and Cates: *Encyclopædia of chronology.*
23.

SOCIOLOGY.

Bliss: *Cyclopædia of social reform.*
1.

Bowker and Iles: *Reader's guide in economic, social, and political science.*
10. 21.

SANITARY SCIENCE.

Chadwick: *The health of nations.*
10. 23.

Chapin: *Municipal situation in the United States.*
10. 23.

Hutchison: *Food and dietetics.*
10. 1. 23.

Notter: *Treatise on Hygiene.*
10. 23.

Richards: *Food materials and their adulteration.*
10. 23.

Richards: *The cost of living.*
23. 25.

Sedgwick: *Principles of sanitary science and the public health.*
10. 25.

Simon: *English sanitary institutions.*
10.

Stevenson and Murphy: *Treatise on hygiene.*
10.

Sykes: *Public health problems.*
10.

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LATIN.

Cruttwell: *History of Roman literature.*
13.

Du Ruy: *History of Rome.*
13.

Fowler: *Roman festivals.*
13.

Froude: *Cæsar.*
13.

Johnston: *The private life of the Romans.*
13.

Lanciani: *Ancient Rome in the light of recent discoveries.*
13.

Lanciani: *Pagan and Christian Rome.*
13.

Mau: *Pompeii, its life and art.*
13.

McKail: *Latin literature.*
13.

Merivale: *History of Rome.*
13.

Middleton: *Remains of ancient Rome.*
13.

Mommsen: *History of Rome.* 4 v.
13.

Myers: *Essays.*
13.

Seyffert: *Dictionary of classical antiquities.*
13.

Smith: *Atlas of ancient geography.*
25.

Smith: *Dictionary of Greek and Roman antiquities.* 2 v.
13.

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Smith: *Dictionary of Greek and Roman biography and mythology.*

13.

Smith: *Dictionary of Greek and Roman geography.*

13.

Strachan-Davidson: *Cicero.*

13.

Teuffel: *History of Roman literature* (Warr's translation).

13.

Tyrrell: *Latin poetry.*

13.

ROMANCE.

Larousse: *Grand dictionnaire universel du XIXe siècle.*

1. 4.

La grande encyclopédie.

4.

Littré: *Dictionnaire de la langue française.*

GERMAN.

DICTIONARIES—ENGLISH-GERMAN.

Flügel.

21.

Muret-Sanders.

21.

GERMAN.

Heyne.

3. 21.

Paul.

3.

Sanders.

3.

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HISTORIES OF LANGUAGE.

Behagel: *Geschichte der deutschen sprache.*
3.

Hempl: *German orthography and phonology.*
3.

HISTORIES OF LITERATURE.

Brandes: *Hauptströmungen der litteratur des 19. jahrhunderts.*
3.

Francke: *History of German Literature.*
3.

Freytag: *Bilder aus der deutschen vergangenheit.*
3.

Koch: *Geschichte der deutschen litteratur.* (Sammlung Gœschen.)
3.

Konnecke: *Bilderatlas.*
3.

Scherer: *Geschichte der deutschen litteratur.*
3.

Vogt-Koch: *Deutsche litteraturgeschichte.*
3.

ENGLISH.

Dictionary of national biography.
2.

Brewer: *Reader's handbook.*
2.

Brewer: *Dictionary of phrase and fable.*
2.

Chambers: *Book of days.*
2.

Chambers: *Cyclopædia of English literature.*
2.

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Ryland: *Chronological outline.*
2.

Sonnenschein: *Readers' guides.*
2.

Traill: *Social England.*
1. 2.

DICTIONARIES OF LITERATURE.

Allibone: *Critical dictionary of English literature and of British and American authors.*
1. 2. 21.

Adams, W. D.: *Dictionary of English literature.*
1.

Adams, C. F.: *Handbook of American authors.*
1.

Chambers: *Cyclopædia of English literature.*
2. 21.

Duyckinck: *Cyclopædia of American literature.*
1.

Ryland: *Chronological outlines of English literature.*
2.

Stedman and Hutchinson: *Library of American literature.*
1. 2. 21.

Warner: *Library of the world's best literature.*
21.

Whitcomb: *Chronological outlines of American literature.*
2.

CONCORDANCES.

Bartlett: *Shakspere concordance.*
1. 2. 17.

Berdoe: *Browning cyclopædia.*
21.

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Bradshaw: *Concordance to the poetical works of John Milton.*

2.

Clarke: *Shakspere concordance.*

2.

Cruden: *Bible concordance.*

1.

Ellis: *Lexical concordance to the poetical works of Percy Bysshe Shelley.*

2.

Furness: *Concordance to Shakspere's poems.*

2.

Molineaux: *Phrase-book from the poetic and dramatic works of Robert Browning.*

24.

Pierce: *Dickens dictionary.*

2.

Strong: *Bible concordance.*

19.

Young: *Bible concordance.*

19.

MATHEMATICS.

BIOGRAPHIES OF MATHEMATICIANS.

Ball: *A short history of mathematics.*

22.

Cantor: *Geschichte der mathematik.*

22.

Marie: *Histoire de mathematique.*

22.

Poggendorf: *Wörterbuch.*

22.

HISTORY OF MATHEMATICS.

Ahlman: *Greek geometry from Thales to Euclid.*

22.

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Ball: *Primer of the history of mathematics.*
22.

Cajori: *History of mathematics.*
22.

Clarke: *History of astronomy in the nineteenth century.*
22.

Fink: *A brief history of mathematics.*
22.

Mach: *Mechanics.*
18.

Suter: *Geschichte der mathematischen wissenschaften.*
22.

PHILOSOPHICAL-HISTORICAL.

Hankel: *Geschichte der mathematik.*
22.

Zeuthen: *Histoire des mathematiques.*
22.

PHILOSOPHICAL.

Clifford: *Common sense of the exact sciences.*
22.

Pearson: *Grammar of science.*
22.

Verne. *Logic of chance with reference to its applications to moral and social science.*
22.

PHILOSOPHICAL PEDAGOGICAL.

Perry: *Discussions on teaching of mathematics.*
22.

Smith: *Teaching of elementary mathematics.*
22.

POPULAR.

Bachet: *Problèmes plaisant et délectable.*
22.

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Ball, Sir Robert: *Theory of screws*, appendix II.
22.

Lucas: *Récreations mathematique.*
22.

Schubert: *Mathematical essays.*
22.

PARADOXES.

De Morgan: *A budget of paradoxes.*
22.

ASTRONOMY.

Ball: *Story of the heavens.*
22.

Clarke: *System of the stars.*
22.

Darwin: *Tides.*
22.

Young: *General astronomy.*
22.

Young: *The sun.*
22.

GEOLOGY.

Agassiz: *Three cruises of the Blake.*
14.

Geikie: *Earth sculpture.*
14.

Geikie: *Geological sketches.*
14.

Russell: *Rivers of North America.*
14.

Russell: *Lakes of North America.*
14.

Shaler: *Aspects of the earth.*
14.

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Shaler: *Sea and land.*
14.
Thompson: *Depths of the sea.*
14.

BOOKS OF TRAVEL.

Geographic Journals.

ANATOMY.

Bibliographia medica.
20.
Index catalogue of the surgeon-general's library.
20.
Index medicus.
20.

BOTANY.

Kerner and Oliver: *Natural history of plants.*
20.
Darwin: *Cross- and self-fertilization.*
20.
Darwin: *Insectivorous plants.*
20.
Darwin: *The movement and habits of climbing plants.*
20.
Coulter: *Plant relations.*
20.
Bergen: *Foundations of botany.*
20.
Bailey: *Lessons in botany.*
20.
Barnes: *Plant life.*
20.
Sachs: *Physiology of plants.*
20.

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Green: *Vegetable physiology.*
20.

Strasburger, Noll, Schenck, and Schimper: *Textbook of botany.*
20.

Gray: *Structural botany.*
20.

Goodale: *Physiological botany.*
20.

Frankland: *Friends and foes in the household.*
20.

OLD TESTAMENT LITERATURE AND INTERPRETATION.

Briggs: *General introduction to the study of the Holy Scriptures.*
19.

Briggs: *The higher criticism of the Hexateuch.*
19.

Carpenter and Harford: Battersby. *The Hexateuch.* 2 v.
19.

Cornill: *The prophets of Israel.*
19.

Davison: *The wisdom and literature of the ancients.*
19.

Driver: *Introduction to the literature of the Old Testament.*
19.

Green: *Higher criticism of the Pentateuch.*
19.

Hastings: *Dictionary of the Bible.*
19.

Hastings: *Jewish encyclopædia.*
19.

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Kent: *History of the Hebrews.* 2 v.
19.
Kent: *History of the Jews.* 1 v.
19.
Kent: *Wise men of ancient Israel and their proverbs.*
19.
Kirkpatrick: *The doctrine of the prophets.*
19.
Kittel: *History of the Hebrews.*
19.
McCurdy: *History, prophecy and the monuments.* 3 v.
19.
Smith: *Dictionary of the Bible.*
19.
Smith, George Adam: *Historical geography of the holy land.*
19.
Smith, W. Robertson: *Prophets of Israel.*
19.

PEDAGOGY.

Annual list of books and magazine articles published in the educational review.
21.
Annual proceedings of the N. E. A.
21.
Hall: *Bibliography of education.*
21.
Monroe: *Bibliography of education.*
21.
Laurie: *Historical survey of pre-Christian education.*
21.
Butler: *Meaning of education.*
21.

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Baldwin: *Mental development.*
21.
Harris: *Psychologic foundations of education.*
21.
Baldwin: *Social and ethical interpretation.*
21.
Reports of U. S. commissioner of education.
21.
(*Annual*) *Reports of the U. S. bureau of education.*
21.

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HOW TO FIND A BOOK IN THE LIBRARY.

Since more frequently than not there is no trained attendant in the departmental libraries, the student needs to know for himself how to look up books. Though the separate libraries are not cataloged according to any one system, one of two main systems is used in some more or less modified form in each. Both of these systems—the Dewey Decimal and the Cutter—employ a card catalog; and before they are explained a word may be said about card catalogs.

As the name points out, a card catalog is made up of cards, each citing the author, title, and imprint of a single book. These cards are filed in drawers or trays in alphabetical order. By means of such a catalog one is able to find a book even if the author, title, or subject only be known, as well as to find what the library has by a given author on a given subject, or what it has in a given kind of literature. In order that all this may be possible, a book is entered under several heads: once under its author's name, once under its title, and once under the subject or subjects with which it deals.

THE DEWEY OR DECIMAL SYSTEM OF CLASSIFICATION.

"According to this system the field of knowledge is divided into nine main classes, and these are numbered by the digits, 1 to 9. Cyclopedias, periodicals, etc., so general in character as to belong to *no one* of these classes, are marked "0," nought, and form a tenth class. Each class is similarly separated into nine divisions, general works belonging to *no* division having "0," nought, in place of the division number. Divisions are similarly divided into nine sections, and the process is repeated as

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often as necessary. Thus 512 means Class 5 (Natural Science), Division 1 (Mathematics), Section 2 (Algebra), and every Algebra is numbered 512.

The books on the shelves and the cards in the subject catalog are arranged in simple numerical order, all class numbers being decimals. Since each subject has a definite number, it follows that all books on any subject must stand together. The tables show the order in which subjects follow one another. Thus, 512 Algebra, precedes 513 Geometry, and follows 511 Arithmetic." *Decimal Classification and Relative Index:* Melvil Dewey.

DIVISIONS.

000 General Works.
100 Philosophy.
200 Religion.
300 Sociology.
400 Philology.
500 Natural Science.
600 Useful Arts.
700 Fine Arts.
800 Literature.
900 History.

THE CUTTER SYSTEM.

The Cutter system, in general, arranges books, first according to subjects, and second, according to places or localities. The subject divisions are shown by letters and the localities by numbers. "A single letter marks a great class (J might serve for Government, for example). Another letter added to it indicates a subdivision of that class (e. g. Jq, Punishment). A third letter marks a section of the subdivision (e. g. Jqc, Capital Punishment); and if the splitting up is carried any further, a

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fourth letter would mark a special part of the section. These are arranged like the words in a dictionary:

B	Bcc
Ba	Bcd
Bb	Bcda
Bc	Bcdb
Bca	Bcdba
Bcb	and so on.

But this is not the only way in which classes need to be broken up into parts. Subjects vary according as they relate to different countries. Thus, in Zoology, there are not only books which treat separately of the Invertebrates and of the Vertebrates, of Mammals and of Monkeys, but also books which describe the animals of Africa, of Madagascar, of Borneo. So, in the form-class Literature, the form divisions marked by letters are Fiction, Drama, Poetry, Oratory and the like; the local divisions are, English literature, French literature, German literature. These differences in nature require a corresponding division on the shelves when there is material enough to divide. Since the flora of Africa is not the same as the flora of North America, the books on it should not be in the same place in a botanical library. As the fauna of the Arctic regions differs from the fauna of the Tropics, a zoological library should not mix the books upon them. . . . This kind of subdivision it is desirable to mark in some different way from the other, for two reasons: First, because it is different, a division not by subject but by locality; and second, because it is suitable and convenient that the mark for each country should be the same for all the different classes, and also that it should not be used for any different purpose. We cannot employ the letters for this purpose, for they are already taken for subject-marks; we therefore use fig-

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ures. If, for example, 45 is the mark for England, and D is church history, then D45 is English church history.

F is History.	F45 is English History.
G is Travels.	G45 is English Travels.
K is Law.	K45 is English Law.
N is Botany.	N45 is English Botany.
O is Zoology.	O45 is English Zoology.

Whenever one meets 45 one knows that it means England, and that in this part of the classification we shall find books treating of the subject to whose class-letter it is annexed, with special reference to England. And, on the other hand, if we wish to find the books about England in any class we look for 45 in the series of numbers under that class-mark. *Expansive Classification.* C. A. Cutter.

GETTING A BIBLIOGRAPHY.

The first thing the student must do in working up a subject is to get his bibliography. An untrained student, when he has settled upon a subject, usually goes to the library and, with the first reference that comes to his hand, begins to read. Not having as yet any precise idea of the scope of his subject, or of the number and kind of books at his disposal, he is sure to work too hard at his one volume—to take voluminous notes, use all his time, wear his interest out. The only cure for this kind of wastage is for the investigator to find out first just how large is the field of books on his particular subject, and then to pick and choose according to his purpose and the time he has. There are three general conditions under which his choosing of a bibliography may be done: (1) If, as is likely, the subject be one chosen in connection with work in another course, the student should first look up his class notes in the course to see whether

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the instructor has not cited a bibliography bearing on that topic. And in this case he can begin at once, by means of the card catalog, the collection of his books. (2) The subject may, on the other hand, be one chosen for its general interest only; and in this case the student will probably have no bibliography whatever. He must then make one for himself; and his success will depend largely on how he begins. First, he should try to get hold of the most general works of reference. A word with an instructor, or with a trained librarian, will most readily put him on the track of these books. Or the list quoted in this pamphlet will start him on his quest. And in each book that he gets, he should make careful search for further reference. (3) If the subject be too new to be found in books, the student must get his material from the magazines and newspapers. For the exploration of a subject through the magazines, there are several large indexes. The most complete are:

1. *Poole's Index.*
2. *The Annual Literary Index.*
3. *The Cumulative Index.*
4. *Index to Periodicals.*

The huge work of Poole in five large volumes is a virtually complete index of all magazine literature in the English language from the beginning of the nineteenth century to 1896. Since 1896 this work has been carried on in the Poole Supplements, and then in the *Annual Literary Index,* in which about 150 English and American periodicals are listed, and in the *Cumulative Index,* in which about 60 periodicals are indexed month by month. To these should be added the *Index to Periodicals,* published annually by the *Review of Reviews,* with a list of about one hundred and ninety titles, most of them British.

All these indexes, together with various other works

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of general bibliography, are to be found on one table in the General Library.

There is no index to newspapers, but each newspaper office keeps for public use a file of its own issues.

HOW TO LOOK UP A SUBJECT.

After getting a bibliography, the student must study it closely to determine whether it is not too large,—whether he will have time to pursue his subject through every book on his list. In case he finds he cannot, he must carefully criticise the list, choosing from it those books best suited to his purpose, and most available. It will be wisest, unless the list is prohibitively long, for him to glance over each book before deciding finally to reject it.

The next step is to choose the right book to begin with. The tendency of the inexperienced writer is to take the first at hand, or the one giving the most detailed information on his subject. The most general works of reference are best to begin with, for in them the student finds the large outlines of his subject, and is thus aided in mapping and laying out his work. If time is to be saved, no note must be taken that is not destined to fit into the finished structure of the theme. And in order that one may determine the fitness of the pieces one must very early know the pattern of the whole. A mosaic worker does not simply amass likely bits of material in the vague hope of their coming aptly to hand sometime; he knows his design and works toward it.

The right book chosen, the matter of next importance is to approach it in the right way. A reference book may be a master or a servant; to one approaching it

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hit or miss, it will usually prove at best an inarticulate slave. There are three approaches to a book, however, which, intelligently used, will lay open its resources to the reader. These are the preface, the table of contents, and the index. In the earlier stages of research, and in looking up large subjects, one must have recourse to the preface and the table of contents. In the preface the student may find information as to the author's attitude toward his subject, his purpose, the limitations he set himself, etc.—information that is likely to illuminate the text for the reader, and also to save his time. For instance, if the volume happen to be Green's *History of the English People,* and the student has come to it for the first time, it is essential that he should know what was Green's idea; viz., that his history should not recount the procession of kings and the sequence of wars, but that it should set forth the steady development of the people of England. Or, if the reference book is the *Dictionary of National Biography,* the student will save time and labor if he reads the preface first, and discovers that two classes of names are omitted from that work; all names of persons not British,—that is, not English, Scotch, or Irish; and all names of British persons now living. At least, then, the preface should always be glanced over; and also, that the student may get an idea of the general plan and the proportions of the book, the table of contents.

If one has proceeded some little way with his work and is looking up topics in detail, the index is the proper approach. It is always to be found at the end, and should be a complete list, classified alphabetically, of the names, topics, etc., that are anywhere spoken of in that work.

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NOTE-TAKING.

In note-taking much time is lost through lack of system. In the first place, in reading for facts, skipping should be the rule. It is considerably easier to read an article entire than to skip with judgment, and it is also more interesting; but such reading is a luxury that costs too many valuable minutes. One should not only skip, but skip through the whole article before taking any notes. In this general view every fact stated is seen in relation to all the other facts and thus seen more truly. A statement read singly, jotted down, and thereby dismissed from the mind, is one thing; modified and colored by the whole drift of a chapter or book it is, perhaps, a quite different thing. By jotting down at once the single fact, one may keep the letter, but sin grievously against the spirit. By skipping through the whole article, moreover, one saves time. It is more than likely that in the course of a chapter or article there may be summaries which will give facts more compactly and in better form for the compiler's purpose than the original detailed statements.

The second injunction is, read critically. The unskillful student is likely to follow his author too much in the spirit of assent, and to be indolent about discriminating fact from opinion. If he is taking his author too easily, his mind slips smoothly along in agreement, but if he keep clear of his author's bias, if he keep the critic's attitude of testing and questioning facts and opinions, there goes on in his mind a reaction of comparison and reference that tends to build up clear and clearer a definite structure of his own conception of this subject.

This injunction leads directly to a third, which bids the student *use his own phrasing*. "Own phrasing" means, of

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course, very much more than the use of a synonym here, and the suppressing of a clause there. It means that the information found must be digested and assimilated,—must become an integral part of the student's mental organism. If this assimilation actually takes place, the phrasing must inevitably be changed and become the student's own, for the information found will have been modified and colored by the mind in which it finds itself entertained. Thus is the subject thought out as he goes along and again the labor of final composition reduced. Or, the mere mechanical labor of writing—no mean consideration in an extended piece of work—may be reduced, if one has a good memory. For, if the information is digested as one goes along, a mere brief phrase will often serve as a note, since the substance of the passage has become a permanent possession and all that is needed is a mnemonic. By this method of procedure, too, the danger of "copying" when the time of composition comes is done away with. And here should be quoted a most clear-sighted and unmistakable paragraph from Mr. Baldwin's *College Manual of Rhetoric.*

"First, cite always; quote rarely; use phrase without quotation never. This last counsel ought to be superfluous; but from a confusion of too copious notes even educated people will make half-conscious borrowings; and until this habit is broken nothing can be learned. Instead, then, of transcribing a passage to a note-book, note the point as briefly as possible, and the volume and page. This saves time, cultivates reflection, fixes the habit, necessary in all serious exposition, of systematic reference. Facts are not copyrighted; but unless a writer is accepted as himself an authority, he is expected to tell where he found them. Form, that is order, grouping, is private property, copyrighted, not to be reproduced without paying royalty, not worth reproducing anyway, since the whole point of writing at all is thereby lost. Phrase is as strictly private as its maker's purse. It may, of course, be quoted, with citation as of fact; but frequent quotation is tiresome and unprofitable. Use without quotation is theft."

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The fourth injunction needs no comment. It is, *be concise.*

In the mechanics of note-taking certain practices should be observed. It is a good plan to underline the important words,—the heading words—in a note, that they may readily catch the eye. And the author, title, volume, and page should always be cited, else much work may have to be done over again, if reconsultation of an author becomes necessary. Lastly, the notes should be taken on cards or on leaves of a small note-book, one note to the page. The advantages of this method are that it does away with the necessity of anything more than a mechanical arrangement when the time of composition comes, and that it permits different trial arrangements to be made with very little labor. The cards are perhaps better in case of extended research, because they are more durable than paper, and do not readily curl at the edges. But the note-book is the cheaper device, and has the advantage of keeping the notes bound until the time of actual composition arrives.[1]

MAKING AN OUTLINE.

The making of outlines is so important a subject, is dwelt upon at such length in all the composition classes, and is treated so fully in all Rhetorics, that it need not be gone into here. On the subject in general, however, I cannot forbear quoting some excellent paragraphs from Mr. J. H. Gardiner's *Forms of Prose Literature:*

"The making of regular plans is an even more valuable practice; it is the kind of exercise that makes the study of English composition something more than practice in phrase-making, and that gives the mastery over large and obstinate masses of

[1] On this subject of note-taking the student should read:
Charles Sears Baldwin: *A College Manual of Rhetoric,* pp. 44-45 ff. Longmans, Green & Co.
Barrett Wendell: *Lectures on English Composition,* pp. 164-165. Chas. Scribner's Sons.

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facts which is the chief aim of education. To get its full value, however, you must take it strenuously. Almost any one with even a superficial acquaintance with a subject can lay out a scheme of headings under which it would be possible to talk about the subject in an interesting and perhaps an intelligible way; for example, in the case of Tyndall's explanation of the source of energy in plants and animals it would be easy to set down such a series of headings as this:

1. Separation of atoms into plants.
2. Combustion.
3. Dependence of animals on plants.
4. Energy of the sun.
5. Thought in relation to energy.

"But such bare headings would not go very far towards producing an efficient explanation. If, however, you begin such a plan by a statement: 'The sun is the source of all energy in nature,' and go on with such a plan as that on pages 254-5, then you have certainly given your mind some valuable exercise; and you have also more tangible results in that your explanation is already more than half accomplished. A plan which consists of mere names is almost valueless, whether to help you to understand your subject more thoroughly or to write your explanation. The invariable rule for making a plan, then, whether it be in pure exposition or in argument, is always to write it in complete statements or propositions. These statements with their connectives, when put together in running form, should contain a summary of the whole exposition. Remember that when you undertake to explain anything you undertake to make your readers see how all the facts bear on one another; and a plan that is to serve you at all must declare the chief of these relations clearly and completely.

"When your plan is made, however, be sure to fix it clearly in the mind of your reader. I have already shown you how explicitly Bryce and Darwin declare not only their order of procedure but also the reasons for their arrangement. You may hear it objected that any such explicit declaration of plan is clumsy and founded on theory; if any such doubts find a lodging in your mind, turn to the passage from Grote's *History of Greece* in Craik's *English Prose* (Volume V, p. 360), which is quoted as an instance of admirable historical style. It begins:

"'The configuration of the Grecian territory, so like in many respects to that of Switzerland, produced two effects of great moment upon the history and character of the people. In the first place it materially strengthened their powers of defense . . . but in the next place, while it tended to protect each section of Greece from being conquered, it also kept them from being politically united . . .'

"So far from its being a blemish on good writing to declare in so many words the actual plan on which you propose to work, you will find that the best writers do this in the frankest way. Any bareness which *a priori* you might expect, is overcome by

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the gain of ease and clarity. We may fall back here on the analogy of architecture where it is a prime doctrine that the lines of structure must be thrown into relief, and that no ornament is beautiful which does not accentuate the construction."

A THEME SUBJECT WORKED UP, WITH BIBLIOGRAPHY AND THE STUDENT'S REPORT ON HIS WORK.

BIBLIOGRAPHY.[1]

Primitive Methods of Lighting:

Mason, O. T.: *The Origins of Invention.*

Mason, O. T.: *Woman's Share in Primitive Culture.*

Popular Science Monthly, Vol. 53, p. 571: *The Eskimo Lamp.*

Egyptian and Hebrew methods:

Encyclopædia Biblica.

Greek and Roman Methods:

Encyclopædia Britannica.

Tsountas, Crestos: *The Mycenean Age.*

Guhl and Koner: *The Life of the Greeks and Romans.*

Smith: *Dictionary of Greek and Roman Antiquities.*

Falke: *Greece and Rome.*

Knight: *American Mechanical Dictionary.*

1. Primitive Lighting.

 Mason (*Origins of Invention*).

 Burning of *natural objects* most primitive method (e. g., pine-knot).

 Fire used for cooking and heating first.

 "In the most primitive society men do not like to be left wholly in the dark."

 Fireflies used in Central America.

[1] My original bibliography was several times this size, the information procurable on the later phases of the subject being many times as voluminous as that on the earlier.

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Warm countries.

Andaman Islands—Torches of resin wrapped in large leaf.

Malay Archipelago—Long *torches* of resin in bamboo splints.

British Guiana—White resin of hyawa tree Kept on hand to start fires. Put in hollow sticks for torches.

Hawaii—Kernels of roasted kukui nuts strung on strips of palm or bamboo. Also *oil squeezed* from nuts and burned in stone cups with wick. Also *animal fats.*

"We procured cocoanut oil, and when it grew dark, breaking a cocoanut in two, took one end and winding a little cotton-wool round the thin stalk of the leaflet of the tree, fixed it erect in the kernel of the nut. This we filled with oil, and thus our lamp, excepting the small piece of cotton-wick, was the product of the cocoanut tree."

Ellis: *Polynesian Researches.*

Mason (*Woman's Share in Primitive Culture*).

Cold countries:

Indians of *British Columbia* and *Oregon coast* used candle-fish (rich in oil) with wick of cedar bark.

Eskimos use lamp-stone. Made of soap-stone; shaped like gibbous moon; whale, seal, walrus, for oil; wick of moss. Where there is no soapstone, clay used, mixed with dog's hair and blood.

No forests; no driftwood. Plenty of blubber.

Popular Science Monthly (Hough on *The Eskimo Lamp.*)

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Lamp absolutely essential: melts snow for drinking water. Each head of family must have one, though two families sometimes in one hut. Special property of women. Placed on grave of woman after her death. Phrase expressing misery is equal to "Woman without a lamp." Significance of variation in length of wick-line. From 2 inches in S. to 17-36 in N.

2. Egyptian and Hebrew Lighting.

Encyclopaedia Biblica:

Oldest form was torch of rush, pine, etc. Oldest form of lamp was shell-shaped clay vessel; open, circular body; projecting rim to prevent spilling. Found in Cyprus 800-400 B. C.

Another kind was *shoe-shaped.* Specimens at Nippur. Plain, blue, enamelled, copper. Post-Babylonian. Used by early Christians.

Wick: flax.

Oil: olive mostly; also oil of sesame, nut and fish oils, naphtha and castor-oils. For temple and tabernacle must be purest olive.

In Egypt salt mixed with oil to purify flame.

Bridal processions held at eventide by light of *torches* (See Matt. xxv:1).

3. Greek and Roman lighting.

Firebaskets:

Guhl and Koner: *The Life of the Greeks and Romans.* For lighting and heating rooms of *Homer's time, firebaskets.* Stood on high poles; burned wood. Similar ones now used by night-travelers in S. Russia and at night ceremonies in India.

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Torches:

Smith: *Dictionary Greek and Roman Antiquities.* Used in *lampadedromia:* 2 types. (1) Thin strips of wood smeared with resin or pitch; held together by ring which also served as guard to hand. (2) Wick steeped in oil or pitch held in hollow of horn-shaped torch.

Falke: *Greece and Rome.* Torches used for street even after lamps introduced.

Lamps:

Guhl and Koner:

Date not accurately known. Known at time of Aristophanes.

Encyclopaedia Britannica:

In general domestic use by 400 B. C. in Greece. No doubt employed long before in temples where torch was not permanent enough.

Knight: *Am. Mech. Dict.*

Sepulchral lamps preserved in tombs.

Encyclopaedia Britannica:

Commonest lamps of terra cotta—boat-shaped. Decoration on handle and top. Designs in relief: legendary, mythical, gladiatorial; chariot races. animals, etc.

Typical form: flat, for steady carrying.

Flat, for steady standing.

Round, because clay.

Bronze lamps retained round form. In hanging lamps decoration on under part. In terra cotta lamps no color except red or black glaze which would resist heat.

Tsountas: *Mycenean Age:*

Formerly thought that pre-Homeric Greeks

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had no lamps—only torches and firepans. Yet they had oil—olive and animal fats. In 1895 excavations at Mycenae showed stone lamp in chamber-tomb.

Falke: *Greece and Rome:*

Light increased by multiplying wicks or placing several lamps together.

Decorative forms: figures supporting disk; trees from branches of which lamps hung; slender, fluted columns; handsome capitals. 4 or 5 feet high. Broad bases.

Standing lamps: candelabra with slender shafts of various heights; disk at top for lamp.

Hanging lamps: stands with arms and chains. In poorer families, of wood; in wealthier, of bronze and costlier metals.

Guhl and Koner:

Soot thick. To be sponged off walls, etc., every day, by slaves.

Base of candelabrum usually 3 paws.

Lanterns

Smith: *Dictionary of Greek and Roman Antiquities:*

Two bronze lanterns. well constructed, found at Herculaneum and Pompeii. One cylindrical; hemispherical cover, perforated, chains and handle; plates of horn; bronze lamp.

Bladder used as well as horn (Martial's Epigrams). Lanterns referred to by Plautus, Martial, and Pliny.

One found in vestibule at Pompeii beside a skeleton. Inference.

Lanterns used in games of circus, in sacred

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games of Greece, in augury, and by the military.

Knight: *Am. Mech. Dict.* Vol. 2.

Perhaps earliest example in sculpture at Alabastron in Egypt, representing patrol on rounds. Two soldiers with shields, spears, etc., one with lantern. Panes probably of talc, the *lapis specularius* of the Romans.

REPORT.

I had at first merely the general idea of writing on the principal methods of artificial illumination, making a sort of brief history of the subject. Having the Encyclopaedia Britannica at hand, I began with that, looking up, first, the subject of *Light*. Under that head I found only a treatise on the physical laws of light and an article on Electric Light. Therefore I merely noted the fact that the incandescent and arc lights were explained on such a page, and turned to *Illumination*. Under that head there was only an account of illumination of manuscripts. I therefore looked up *Candle* and *Lamp* and took notes on the parts I thought I should want. After that I did the same with *Gas*.

Having thus got all I could from the Britannica, I went to the General Library and consulted the card catalogue; the A. L. A. Index; Poole's, the Cumulative, and the Annual Literary Indexes; and the International Year Book for 1899 and 1900. I found very little that I thought would be of help, but took notes of a few references and consulted the Index to Periodicals in Chicago Libraries, to learn where the different bound volumes of the magazines could be found.

I then went to the library of the School of Education, thinking that perhaps in a small general library, de-

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signed to meet the needs of children and teachers, I could best find what I wanted. There I told the librarian what I wished to look up, and she sought out the books for me.

It was there that I got most of my notes. Then in the English Library I got Chambers' *Book of Days,* because I had heard that that contained much miscellaneous and out of the way information, and indeed I found several interesting things in it, particularly about lighting in London at different periods. I had hoped to find something about the matter in Traill's *Social England,* but could not. And in the history library all I got any help from was the *Encyclopaedia Biblica,* from which I got some notes on Egyptian and Jewish customs. All the histories seemed to be political. But probably I did not know how to look.

I ought to have said that I looked for material in all these sources, under the heads of *Lighting, Illumination, Gas, Candles, Lamps,* and that I took my notes on small slips of paper, so as to be able to shuffle them when I came to put them together.

By this time I thought I had enough material to plan out my theme. Looking through my notes, I saw that many of the earlier ones were quite useless for my purpose, which had now become clearer to me, for they dealt with the scientific aspects of the subject, and I had seen that I must limit myself to the historical and social. Therefore I threw out all definitions, all notes dealing with the chemistry of the subject, etc. They represented a good deal of waste labor. Next time I hope to be able to limit my subject earlier. I also saw that I should not have time to look up more than one or two of the most promising of the magazine references.

My notes I arranged roughly in historical order, and

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made from the arrangement a brief sketch or outline of the subject as I intended treating it. This was the rough outline:

1. What artificial light means to mankind.
 Myths dealing with fireless ages of the world.
 Quotation from Draper.

From the customs of certain primitive races today we may judge what the methods of primitive man were.

 Order of development:
 Cooking-fire.
 Torch, etc.
 Primitive methods today:
 Tropical.
 Arctic.
 Ancient Egyptian methods.
 Fire-baskets, torches, lamps, lanterns.
 Ancient Hebrew methods.
 Fire-baskets, torches, lamps, lanterns.
 Ancient Greek methods.
 Fire-baskets, torches, lamps, lanterns.
 Ancient Roman methods.
 Fire-baskets, torches, lamps, lanterns

2. Mediaeval European methods.
 English methods.
 Colonial methods in New England.
 Introduction of gas.
 Introduction of electricity.
 Introduction of acetylene.
 Introduction of gas mantles.
3. Conclusion based on Stevenson's *Plea for Gas Lamps*.

(1) This I threw out when I saw how long paper was going to be.
(2) Thrown out.
(3) This had to be thrown out when (2) went, because it did not then fit.

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When I came to write, I found, much to my surprise, that by the end of my treatment of Greek and Roman lighting I had reached the twelve-page limit for an average sophomore theme. Therefore I have had to let the notes on later methods go—or perhaps I can use them for another exposition—or more than one, even. They include English and American methods of lighting at various periods, and the introduction of gas, electricity, acetylene, and gas mantles. I have learned a good deal about limiting a subject from my experience with this theme, and so I think the apparently waste time was not really wasted.

THEME.

SOME EARLY METHODS OF ARTIFICIAL LIGHTING.

Among all peoples of whom we have any record bearing on the point the early evolution of artificial lighting appears to have followed a certain uniform order, proceeding from the cooking-fire to the burning of natural objects, the torch, the lamp, the lantern, and the candle.

Fire was, of course, used for cooking and heating before it was used specifically for lighting. But it could not have been long before primitive man discovered the advantage of prolonging his day, and thereby put his cooking-fire to a new use. Moreover, as an eminent ethnologist[1] has pointed out, "in the most primitive society men do not like to be left wholly in the dark." Artificial illumination had its psychological reason as well as its practical.

From the customs of certain savage and barbarous races with which we are familiar at the present day we may judge with a probably fair degree of accuracy what were the earliest methods of artificial illumination. Perhaps the crudest means of getting light in the darkness,

[1] O. T. Mason, Curator Smithson Inst., in *Origins of Invention*.

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of which we have any knowledge, is that employed by the natives of Central America, who imprison fireflies and thus get illumination for their huts. The Atlantic coast tribes of North American Indians used the rich pine-knots—a custom in which they were copied by the earliest colonists. There could be no method simpler than these. Requiring some ingenuity are the means used by the Andamanese, who when fishing, traveling, or dancing by night, employ torches of resin wrapped in a large leaf. Throughout the Malay Archipelago, too, resin is used, in the form of torches of long bamboo splints. In British Guiana the fragrant white resin which exudes from the hyawa tree and which is very inflammable, is not only kept in stock, as it were, by the natives, to start their fires with, but is put into hollow sticks for torches as well. In the Hawaiian Islands the kernels of the kukui nut, rich in oil, are used in two ways. Either the roasted kernels are strung on slender strips of palm or bamboo and burned one at a time, the ashes of one nut being knocked off the strip as another catches fire; or the oil is expressed and burned with a wick in a stone cup. This second plan is of course a step in advance of the other, requiring, as it does, other than natural objects (i. e., the cup) and not demanding so much tending. In Hawaii, too, animal fat is used, with a dried rush or a piece of kapa as a wick. And Ellis, in his *Polynesian Researches,* gives the following account: "We procured cocoanut oil, and when it grew dark, breaking a cocoanut in two, took one end, and winding a little cotton-wool round the thin stalk of the leaflet of the tree, fixed it erect in the kernel of the nut. This we filled with oil, and thus our lamp, excepting the small piece of cotton-wick, was the product of the cocoanut tree."

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To take a long journey northward,—the Indians of British Columbia and along the coast of Oregon used for lighting purposes a fish called the candle-fish—a creature so rich in oil as to burn with a wick of cedar-bark drawn through it.

But light, like most other good things, comes harder to the dwellers in the very cold lands, and is at the same time, perhaps, more necessary. The famous Eskimo lamp-stone is an absolute necessity to the inhabitant of the arctics, for he must melt snow by it for his drinking water, as well as warm his hut, and light his long night. The conditions with which he has to reckon are the absence of forests and of driftwood in any quantity, and, on the other hand, the presence of mosses and other vegetable fibres, and of soap-stone or clay, together with an abundance of animal fats. Therefore inevitably comes into being his lamp-stove, shaped "like a turn-over pie," with one convex and one almost straight edge, hollowed slightly for the reception of the oil, and having a line of dried and crushed moss along one edge, to serve as wick. In the regions where soapstone fails the lamps are made of clay mixed with dog's hair and blood. Everywhere the fuel is the blubber of the seal or whale or walrus or some other arctic animal. These lamps are so important that every head of a family must have one, even though two families may occupy the same hut. They are the peculiar property of the women, and the Eskimos can express misery in no stronger way than by the phrase "a woman without a lamp."[1] After the death of a woman her lamp is placed on her grave. A very significant fact has been mentioned by Mr. Hough in his study of the Eskimo lamp-stove.[1] It seems that the length of the wick-line has been found to increase as

[1] W. E. Hough in *Popular Science Monthly*, "The Eskimo Lamp."

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one travels north among the Eskimos, so that while in the south it may be only two inches, at the northernmost point it is from seventeen to thirty-six inches. The variation is so uniform that by the length of the wick-line may be told the latitude from which the lamp has come.

So much for primitive methods. Rising in the scale of civilization by many degrees, we find among the Egyptians and the Hebrews both torches of rush, pine, etc., and lamps. The oldest kind of lamp was a shell-shaped clay vessel with a circular opening and a rim to prevent spilling of the oil. Such lamps were found in Cyprus from the eighth to the fourth century B. C. Another sort was the shoe-shaped lamp, of which specimens have ben found at Nippur. These were of different styles, some plain, some blue-enamelled, and a few copper. Lamps like these were used by the early Christians. The wick, among both Hebrews and Egyptians, was commonly of flax. The oil was usually olive. Oil of sesame, nut-oil, fish-oil, and naphtha and castor-oil were all burned, but the oil for the tabernacle and temple must be the purest olive. In Egypt salt was mixed with the oil to purify the flame.

Until recently it was supposed that the early Greeks had no lamps, because, though it was known that the pre-Homeric Greeks slaughtered animals and had olive-oil, in the Homeric poems mention is made only of torches and firepans. But in 1895 the excavations at Mycenae revealed in one of the chamber tombs a stone lamp with graceful decorations. It is, in fact, largely owing to the use of sepulchral lamps and their preservation in tombs, that we have knowledge of the forms used by the ancients.

In Homer's time the same device served for both lighting and heating the rooms. It was a fire-basket,

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standing on a high pole and fed with wood. Such an arrangement is still used by night-travelers in southern Russia.[1] The date of oil-lamps in Greece cannot be stated accurately. They were in general use in the houses by 400 B. C. and had doubtless been used long previously in temples, where lights more permanent than torches were required.

After the introduction of oil-lamps the use of torches was confined to the street. These torches were of two types—or at least the description that has come down to use of those used in the lampadedromia, a torch-race, gives two types. Either there were thin strips of wood smeared with resin or pitch and held together by a ring which also served to catch the dropping pitch and protect from it the hand below; or a wick soaked in oil or liquid pitch was placed in a hollow at the top, or large end, of a horn-shaped torch, such as we see in Greek friezes.

The commonest sort of lamps in both Greece and Rome, and the earliest sort, were of terra-cotta, shaped like a gravy-boat, with a spout or projecting lip for the wick, a handle, and sometimes a palmette for the thumb, to aid steadiness in carrying. They were flat, that they might both be carried steadily and stand steadily, and they were round because made of clay. No color was used except the red or black glaze which would resist heat. Later, when bronze lamps came to be used, though the exigency of the material no longer demanded it, the round shape was retained. The decoration for table lamps was usually confined to the front of the handle or the circular space on the top. On hanging-lamps the decoration was placed underneath. It consisted, almost always, of designs in relief, sometimes

[1] Guhl & Koner: *The Life of the Greeks and Romans.*

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conventional, sometimes of mythological and legendary subjects, objects and scenes of daily life, scenes from chariot races and gladiatorial combats, figures of animals and scenes from the chase. Lamps were also made of fantastic shapes, as in the form of animals.[1]

But all these lamps, so elegant in design, had their great inconvenience. They burned heavy oil, which gave a smoky flame and deposited a layer of soot on all the furniture and wall-paintings, which had to be carefully sponged every morning by the slaves. Nor could the light be increased by enlarging the wick, for thus the interior of the flame did not receive enough air for complete combustion, and intolerable smokiness was the result. The illumination must be enhanced by multiplying the wicks or by placing several lamps together. Thus we find lamps with two, three, four, or even twelve or twenty spouts, and we find several lamps grouped on a candelabrum.

These candelabra were of two sorts—those for standing-lamps and those for hanging-lamps. They might contain, in either case, not many lights but one. Those for standing-lamps consisted of slender shafts of various heights, with a disk above to hold the lamp or lamps. Sometimes human figures supported the disk; sometimes the shaft was in the form of a slender fluted column with a graceful capital on which the lamp was placed. In any case, the base was usually a tripod, generally in the form of three paws. The candelabra for hanging-lamps were stands with projecting arms from which chains depended. Sometimes the form of a tree with branches was used. In poorer houses the stands were made of wood; among the wealthy they were of bronze and costlier metals.

[1] Ency. Brit. *Lamps*, v. XIV, p. 244.

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At just what time developed the idea of protecting a flame from the wind by a translucent screen, thus making a lantern, is not known. Perhaps the earliest example is in a sculpture at Alabastron in Egypt, representing a patrol on its rounds. Two soldiers are armed with spears, shields, and battle-axes, and the third carries a lantern of simple shape, swung on a bent rod of some sort. The panes were probably of talc, the *lapis specularius* of the Romans. In Rome, horn was used, and, as we know from Martial's epigrams, bladder. Two bronze lanterns, constructed with skill, have been found in the ruins of Herculaneum and Pompeii. One is of cylindrical form, with a perforated hemispherical cover, hanging from a straight handle by two chains and containing a bronze lamp. The plates are of horn. One of the lanterns was found in the vestibule of a house, beside a skeleton—evidently that of a person who was attempting to escape through the ashy darkness.

It is a long way from the pine-knot or the resin torch to a decorated bronze lantern with a lamp and wick and horn panes. But it is not so important as the step from darkness to the pine-knot. That was the seed of a tremendous evolution. As Draper says: "The invention of artificial light has extended the available term of human life, by giving the night to man's use; it has, by the social intercourse it encourages, polished his manners and refined his tastes, perhaps, as much as anything else, has aided his intellectual progress."

The material on the preceding pages was worked up at the request of the author for the purposes of this pamphlet. The writer chose his own subject merely because of interest. As his own statement (quoted on pp. 140-146) shows, he wasted much time and energy by not limiting his subject early enough. His method, though by no means a model, is at the same time good enough, and in its mistakes typical enough, to be of help to the average student.

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Mr. McDonald:
Mr. President, I move we adjourn.

Mr. Comstock:
Mr. President, I second the motion.

Mr. Powell:
Mr. President, I am opposed to this motion, since the business—

Mr. Fair:
Mr. President, I rise to a point of order. The motion is not debatable. (Robert's Rules of Order, Sec. 35.)

President:
Mr. Fair's point of order is sustained, Mr. Powell will yield the floor.

Mr. Hall:
Mr. President, I move to amend the motion now before the house.

Mr. Field:
Mr. President, I second the motion.

Mr. Hooker:
Mr. President, I move to amend the amendment.

Mr. Lawson:
Mr. President, I second the motion.

Mr. Logan:
Mr. President, I move to amend Mr. Hooker's amendment.

Mr. Wilson:
Mr. President, I rise to a point of order, as Mr. Logan's motion is out of order according to Robert's Rules, Sec. 23.

President:
The chair decides Mr. Logan's motion out of order.

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